

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.

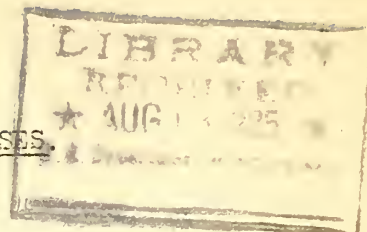


138  
76432

BLISTER RUST DAMAGE TO WHITE PINE BY AGE CLASSES.

By G.B. Posey  
Office of Blister Rust Control

May 23, 1925.



The following summaries of twelve demonstration plots and strip studies sent in by agents and blister rust specialists throws some light on the subject of Damage to Pine By Age Classes. The same type of data were taken in each of the studies. A total of 12 or more persons assisted in taking the data in Maine, Massachusetts, Vermont and New Hampshire. Trees were classified by three age classes, Class 1 (trees 4 to 10 years old), Class 2 (trees 11 to 20 years old), Class 3 (trees 21 years and up). All trees on the areas were included and each was studied separately and the following questions answered: (1) Has the tree been attacked by blister rust? (2) Has the tree been killed by blister rust? (3) As indicated by the location of the cankers on the tree will it be killed by blister rust cankers visible at the time the study was made?

Studies with the Three Age Classes of Trees Represented

Seven of the twelve studies contained varying numbers of each of the three age classes.

Three of these seven studies on the basis of the percentage of trees seriously infected in each age class on each area, indicate that the percentage of trees seriously infected increased with the age classes of trees. The data for the three studies are shown in the following tabulations:



Table I.

Tree age class	Number trees	No. trees dead or with killing cankers	% of trees dead or with killing cankers	State and by whom study was made
4-10 years	2	0	0	In Vermont by Fivaz and Bradder
11-20 "	115	64	55.7	
21 and over	13	8	61.5	
4-10 years	17	7	41.5	In Massachusetts Hodgkins, Merrick and Clave
11-20 "	148	79	53.4	
21 years and over	10	9	90.1	
4-10 years	7	5	71.4	In Maine by Endersbee and Kimball
11-20 "	129	115	89.1	
21 years and over	22	20	90.0	

Table II.

Summary of Percentages of Trees Seriously Infected for the Three Studies Above

Tree age classes	Range of percentages of trees seriously infected	Average of percentages of trees seriously infected	Number of studies
4-10 years	0 to 71.4%	37.6	3
11-20 "	53.4 to 89.1%	66.1	3
21 years and over	61.5 to 90.1%	80.8	3

Two of the seven studies, on the basis of the percentage of trees seriously infected in each tree age class on each area indicate that the percentage of trees seriously infected decreased as the age class of the trees increased. The data for the two studies are shown in the following tabulation:



Table III.

Tree age classes	Number trees	Number trees dead or with killing cankers	% of trees dead or with killing cankers	State and by whom studies were made
4-10 years	4	3	75	In Massachusetts
11-20 years	22	13	59.1	by Hodgkins,
21 years and over	39	22	56.4	Brockway

Table IV.

Tree age classes	Number trees	Number trees dead or with killing cankers	% of trees dead or with killing cankers	State and by whom studied
4-10 years	752	173	23	In New Hampshire by
11-20 "	487	91	18.7	Endershee,
21 years and over	19	2	10.5	Fitzpatrick and White

Table V.

Summary of Percentages of Trees Seriously Infected for the Two Studies Above

Tree age classes	Range of percentages of trees seriously infected	Averages of percentages of trees seriously infected	Number of studies
4-10 years	23 to 75%	49	2
11-20 "	18.7 to 59.1%	39.9	2
21 years and over	10.5 to 56.4%	22.3	2

Two of the seven studies, on the basis of the percentage of trees seriously infected in each tree age class on each area, indicate that the percentage of trees seriously infected was lowest for the medium age class of trees (11-20 years old).

The data for the two studies are shown in the following tabulations:





Table VI.

Tree age classes	Number trees	No. trees dead or with killing cankers	% trees dead or with killing cankers	State and by whom studied
4-10 years	5	4	80	Massachusetts by Hodgkins and Brockway
11-20 years	27	11	40.7	
21 years and over	30	17	56.7	
4-10 years	85	28	32.9	Massachusetts by Hodgkins, Wheeler and Dickey
11-20 years	23	5	21.7	
21 years and over	21	8	38.1	

Table VII.

Summary of Percentages of Trees Severely Infected for the Two Studies Above

Tree age classes	Range of percentages of trees seriously infected	Averages of percentages of trees seriously infected	Number of studies
4-10 years	32.9 to 80	56.6	2
11-20 "	21.7 to 40.7	30.7	2
21 years and over	38.1 to 56.7	47.4	2

Table VIII.

Summary of Percentages of Trees Seriously Infected for the Seven Studies Having the Three Tree Age Classes Represented

Tree age classes	Range of percentages of trees seriously infected	Average of percentages of trees seriously infected	Number of studies
4-10 years	0 to 80	46.3	7
11-20	18.7 to 89.1	48.3	7
21 years and over	10.5 to 90.9	57.6	7



Studies Having only the First Two Age Classes of Trees Represented

Four of the twelve areas studied contained only trees of the 4-10 year and the 11-20 year age classes. On the basis of the percentage of trees seriously infected in the two age classes on each area, the studies indicate in all four cases that the older of the two age classes of trees have the highest percentage of trees seriously infected. The data for the four studies are shown in the following tabulations:

Table IX

Tree age classes	Number trees	Number trees dead or with killing cankers	% of trees dead or with killing cankers	State and by whom studied
4-10 years	656	411	62.7	In Vermont by Fivaz and Holden
11-20 "	6	4	66.7	
4-10 years	50	7	14.	In Mass. by Hodgkins and Morse.
11-20 "	129	35	27.2	
4-10 years	129	40	31.	In Mass. by Hodgkins, Merrick and Calve.
11-20 "	9	5	55.6	
4-10 years	605	39	6.4	In Mass. by Hodgkins, Merrick and Calve.
11-20 "	37	12	32.5	

*Journal of Management Education* 26(7)

Table X

Summary of percentages of Trees Seriously Infected for the Four Studies Above

Tree age classes	Range of percentages of trees seriously infected	Average of percentages of trees seriously infected	Number of studies
4-10 years	6.4 to 62.7	23.5	4
11-20 years	27.2 to 66.7	45.5	4

Studies Having only the Second Two Age Classes of Trees Represented

One of the twelve areas studied contained only trees of the 11 to 20 and 21 and over age classes. On the basis of the percentage of trees seriously infected in the two age classes on the areas the older age class of trees shows a slightly higher percentage of trees seriously infected. The data for the study are shown in the following tabulations:

Table XI

Tree age classes	Number trees	Number trees dead or with killing cankers	% of trees dead or with killing cankers	State and by whom studied
11-20 years	7	6	85.7	In Vermont by
21 years and over	157	132	86.	Fivaz and Rose

General Summary of the Twelve Studies

1. Number of studies where a comparison was made on the basis of percentage of trees seriously infected between the 4-10 year and the 11-20 age classes = 11.





Of these 4 showed that the highest percentage of trees seriously infected were in the 4-10 year age class and 7 the highest percentage in the 11-20 year age class. On the average the percentage of trees seriously infected was 7.6 per cent higher in the 11-20 than in 4-10 age class.

2. Number of studies where a comparison was made on the same basis as above between the 11-20 and 21 and over age classes = 8. Of these, 2 showed that the highest percentage of trees seriously infected were in the 11-20 age class and 6 the highest percentages in the 21 and over age class. On the average the percentage of trees seriously infected was 8.1 higher in the 21 and over than in the 11-20 age class.

#### Summary of Other Facts Shown in the Twelve Studies

On the basis of the maximum ages of cankers (assuming that the cankers developed from needle infection) more than 80% of the infections occurred during the four infection seasons of 1917 to 1920 inclusive. The studies were made at the end of the 1923 season. Thus there was a period of 4 to 6 years during which most of the development of the rust lesions took place. Since this is a comparatively short period it would seem to preclude the likelihood that any appreciable number of young trees had died and disappeared before the studies were made, especially so, in light of the strong probability that in general a large percentage of blister rust cankers on pines are a year or two younger than the wood upon which they start. Data substantiating this fact is now in process of preparation for publication. Though it is likely that even in this short period of time some of the seriously infected trees would not develop cankers as the result of later exposures because of the condition of trees at the time.





On the basis of the averages of percentages of infected trees that recovered, or will recover, by tree age classes in the twelve study areas 0.5% of the 4-10 year age class will recover as compared with a recovery of 3.1% in the 11-20 year age class and 12.4% in the 21 year and over age class. Thus, it is indicated that the percentages of infected trees that recovered from blister rust attacks increased with the age class of the trees.

The averages of percentages of seriously infected trees that have died by tree age classes are as follows: 4-10 year age class 50.4%, 11-20 year age class 19.0%, 21 year and above age class 0.9%. Thus it is indicated that seriously infected young trees are killed much quicker than seriously infected trees of older age classes.

The twelve studies, the data of which is tabulated above, were carried out in the following towns:

Maine

1 in Bowdoin, Androscoggin County.

Massachusetts

3 in Ashburnham, Worcester County.

1 in Huntington, Hampshire County.

2 in Pembroke, Plymouth County.

1 in Warwick, Franklin County.

New Hampshire

1 in Alton, Belknap County.

Vermont

1 in Barnet, Caledonia County.

1 in Townshend, Windham County.

1 in Tunbridge, Orange County.

